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Integrative Biology 411 - Bioinspiration
3 Credit Hours
(https://learn.illinois.edu/)
Fall 2019 Syllabus

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Teaching Team

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Course Description

This fully ONLINE, 8-week course focuses on how experts in biology and technological fields find inspiration in nature and use it as a model for technological innovation and to solve human problems. In the future, our day-to-day living, health, and the environment will benefit from using findings in basic research in biology for technological innovation, as it has in the past. Topics to be explored include efficient architecture, cooperative control, robotics, multimodal sensory integration for controlling behavior, and advanced materials.

Definition of a Course Week

In this course, a Module starts on SATURDAY at 12:00 AM Central Time and ends on SUNDAY (+1 week & 1 day) at 11:59 PM Central Time. Assignments are due by 11:55 PM, unless otherwise specified (Quizzes open at 6AM on Friday, **close at Noon on Monday**). During Fall break (Thanksgiving) the Module 6 will open earlier and stay open longer. You are still expected to do the same work load during that week but deadlines will accommodate for travel. Please plan to do work related to the course during at least one of the two weekends of Fall break. Of course, the beauty of an online course is that you can do this work anywhere as long as you have internet access.

For more information, see the <University's Academic Calendar>.

Required Materials and Services

There are no formal textbooks for this course. Rather, please refer to the optional books of interest, websites, and e-Reserve information listed in the overview of each weekly module.

Learning Outcomes

Upon completing this course, students will:

- Have a solid understanding of nature as inspiration for innovation.
- Be able to explain the concepts learned to a variety of audiences in a clear and concise manner.
- Be able to apply the tools learned to arrive at sustainable design, engineering, architecture and/or business solutions.
- Conclude the course with an overview of bioinspired innovation in the form of a course glossary, a series of forum posts and final project

Course Organization

This is a 3-credit hour course. The course is 8 weeks long; it consists of 8 content modules. Please be aware that this course is accelerated; 16 weeks' worth of content will be covered in an 8-week time span. You should dedicate approximately 12–16 hours per week to working on the course itself, but actual time commitments will vary depending on your input, needs, and personal study habits. You are required to log on to the course website a minimum of 4 days per week but as discussions develop, you will probably need to do so more frequently.

This course is designed with the principles of collaborative learning, constructivism, and active participation in mind. You are encouraged to share your thoughts and engage in problem solving. The course has a consistent and predictable structure, organized around the modules, with a course website that is straightforward and easy to navigate. Instructions and due dates for activities and assignments are clearly articulated so that you know what is expected of you, and you will be able to easily stay on track.

We realize that you have a life beyond the scope of this course. However, if you are unable to complete an assignment because of other obligations, you should notify the instructor or, better yet, prepare the assignment ahead of time and post it early. This will give your classmates a head start in reading and responding to your work. Most assignments are due by 11:55 PM CT of their respective due dates as listed with the assignment, giving you and your classmates time to read and comment on other participants' work before the next module begins.

Topic Schedule

(for up to date information make sure to check the calendar on the course's Moodle site https://learn.illinois.edu/):

Week 1: Introduction to Bioinspiration and Biomimicry. Creativity and Innovation
Week 2: Biological Materials & Nanostructures
Week 3: Robotics
Week 4: Sensing the Environment
Week 5: Maintaining Community
Week 6: Energy and Architecture
Week 7: Bioinspiration and Human Health
Week 8: The Business of Bioinspiration.

Course Activities & Grading

You are expected to complete your work independently, in accordance with University policy. Failure to do so will result in strict disciplinary action, including loss of all credit for the assignment, notification of a dean, and possible dismissal from the University. You may work with others on homework, but the final product must be your own.

Assignments, Weights, and Deliverables

Assignments	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total points per assignment	Relative Weight
Intro Assignments (Orientation Quiz, How to Research the Scientific Literature, Getting to Know Your Classmates)	10								10	~2%
Forum Assignments	20 (Fieldtrip Post)	20 (Ashby Plot Post)	20 (Robot Design)	20 (Sensor for Robot Design)	20 (Flocking)	20 (Building Design)	20 (Biol in Health Care)	20 (Bioinspiration Tools)	160	28%
Glossaries of Bioinspiration	20	20	20	20	20	20	20	0	140	23%
Quizzes	15	15	15	15	15	15	15	15	120	24%
Minute Papers	5	5	5	5	5	5	5	5	40	7%
PRTT Project - Project Proposal				10					10	~2%
PRTT Project - Peer Grading (Submission)							70		70	12%
PRTT Project - Peer Grading (Assessment)								20	20	~3%
Total	70	60	60	70	60	60	130	60	570	100%

The Module's Overview Page

Each module will begin with an overview page. This page will explain what the module is about, what learning goals you are expected to achieve, and in what activities you will participate. Each module is designed with the same structure and activities unless otherwise specified. The module activities are explained in greater detail below. You can find the due dates of specific assignments on the assignment's page.

Lessons, Readings and Resources

Lessons are designed to give an overview of the topic at hand. The lectures are delivered as Moodle lessons. They will include text, pictures, graphs, video and audio. The lectures are designed specifically for the online environment. All content will be made accessible to all students.

Lessons may have questions included in them. Please answer the questions since they will help you remember what you have learned, or to apply what you have learned and already

know. The answers will be recorded and will inform the instructors of the student's interests and abilities. The next time you open the Lesson (to study for the quiz, for instance) you will notice that the answer blocks to the questions are empty. That is OK, your previous answers were recorded and you can now just skip the question.

No textbook is required. Each module has required readings that will allow you to gain more insight into the topic – beyond the lecture or to support the lecture. Readings will come from primary literature, secondary literature, or current high-quality science writing on the web (including bioinspiration blog by the instructor). Videos, podcast, audio recordings will also be included into the modules. They include interviews with (Illinois) scientists who do cutting-edge research in the field discussed that week.

Forum Assignments

Each week, you will answer discussion questions or complete an assignment. You will post your work to the Discussion forum. You are expected to contribute constructive feedback to your course-mate's posts and facilitate the discussion in your own thread. I tried to create a little bit of variety by changing the expectations for the "Discussions/Forums a little bit from module to module. In fact, sometimes the discussion assignment is not really a discussion on a topic with multiple points of view - it is "just" an assignment - but since we encourage you to share your work and comment on the work of others we put the assignment in a discussion forum.

Glossary of Bioinspiration

Each week, you will contribute your own background research on a bioinspired product or process. You will be assigned a topic each week. You are also expected to give constructive feedback to your course-mate's entries. Also, update your glossary entry based on other people's suggestions.

Quizzes

At the end of each module, students will take a self-paced quiz to evaluate new knowledge obtained (from lecture, readings, videos, synchronous discussion, etc.). This will be a mixture of multiple choice, true/false, matching, and short answer questions. You will get one attempt to take the weekly quiz. Once you start you have 90 minutes to complete the quiz. (You can take the Orientation quiz and the How to Research Scientific Literature quiz multiple times.)

Minute Papers

Once per week consider the materials you have reviewed during the module—the lessons, the readings, and any other activities you undertook. Write a reflective post. What was the most interesting thing you learned in this module? Please mention any problems you might have had understanding any part of the module. How might this information have been presented differently to make it more clear? You should view this as a formative assessment exercise

that will also help the instructor determine where your interests lie, and improve on the course for the next time the course is offered.

Peer-reviewed Teaching Tool Project

You are tasked to create a teaching tool on a topic related to bioinspiration. This can be a video or an audio podcast, a cartoon, a "buzzfeed" post, etc. After you submitted a proposal and then the final project your peers will grade your work, and you will grade the work of 5 of your peers. Please read instructions carefully about how to upload you work.

A note about sources of information: It is highly recommend that you only consult the following sources of information in studying for this class. Use of another source (such as Internet sites found via Google) may provide information that is unreliable.

- Suggested books and required readings
- Supplemental information posted on course website
- Internet links provided in class or on course website

Course Grading Scale

Grade	Percent
A+	98–100
A	93–97.99
A–	90–92.99
B+	88–89.99
B	83–87.99
B–	80–82.99
C+	78–79.99
C	73–77.99
C–	70–72.99
D+	68–69.99
D	63–67.99
D–	60–62.99
F–	0–59.99

If you need help:

- Contact your instructor directly if you have a personal question. (*Instructor email*)
- For all other questions about course content, activities, deadlines, technical problems, etc., please check the General Q & A forum on Moodle to see if someone else has already asked your same question and received a response.
- If your question isn't there yet, post your question to the General Q & A forum. Feel free to help your peers out if you know the answer!
- If you have technical problems, please fill out this form (*link to ATLAS-tlt*).

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For more information, see the University's Academic Calendar.

Student Commitment

By registering for this online course, you commit to self-motivated study, participation in online course activities, and timely submission of all assignments. Furthermore, you commit to accessing the course website and checking e-mail at least 4 days per week, as well as to devoting at least 12–16 hours weekly to preparing for each module and completing the required assignments and readings.

Late Submissions of Assignments

Assignments, case studies, reflective essays, and other written work (collectively referred to as assignments) are due by **11:55 PM** Central Time on the dates specified in the course calendar, unless otherwise noted. Unless permission from the instructor is obtained **at least 1 day before a due date**, projects later than 24 hours past the due date will not receive a grade. Quizzes are open to students for more than 72 hours (Friday 6 AM – Monday noon). Quizzes will not be accessible after the noon deadline.

Being Excused from Assignments

If you wish to be excused from participation in class discussions or from submitting projects on time because of medical reasons or personal emergencies, you must address the issue with the course instructor. Because of this course's fast pace and the potential effect that such excusals may have on your ability to complete it successfully, such accommodation will be made on a case-by-case basis.

Instructor Feedback Turnaround Time

Questions posted to the **Course Q & A** forum generally will be answered within 48 hours. If possible, students are encouraged to answer questions posted by other students to the Course Q & A forum, rather than waiting for an instructor's response.

Assignments submitted online will be reviewed and graded by the course instructor within 3 business days. Exams, essays, and term papers will be graded within 5 business days.

Responding to E-mails

The instructor will respond to e-mail messages within 48 hours of receiving them unless the instructor notifies you ahead of time of an inability to do so. **When sending e-mail, include a subject line that identifies the course number and nature of your question.** The instructor may not respond to questions sent to him or her that should be posted in the Course Q & A forum. Please don't be offended if you are asked to forward your question to this location.

Responding to the Discussion Forums

The role of the instructor within the discussion forums is to help facilitate discussion by providing probing questions, asking for clarification, and helping solve conflicts, as necessary. The instructor will not respond to every post; you are encouraged to share your thoughts, experiences, and ideas with each other as well.

Expectations

According to the Student Code, `It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.' Please know that it is my responsibility as an instructor to uphold the academic integrity policy of the University, which can be found here: http://studentcode.illinois.edu/article1_part4_1-401.html

Academic dishonesty will not be tolerated. Examples of academic dishonesty include the following:

- Cheating
- Fabrication
- Facilitating infractions of academic integrity
- Plagiarism
- Bribes, favors, and threats
- Academic interference
- Examination by proxy
- Grade tampering
- Non-original works

Guidelines

Should an incident arise in which a student is thought to have violated academic integrity, the student will be processed under the disciplinary policy set forth in the Illinois Academic Integrity Policy.

If you do not understand relevant definitions of academic infractions, contact the instructor for an explanation within the first week of class.

Student Content

Participants in University of Illinois courses retain copyright of all assignments and posts they complete; however, all materials may be used for educational purposes within the given course. In group projects, only the portion of the work completed by a particular individual is copyrighted by that individual. The University of Illinois may request that students' materials be shared with future courses, but such sharing will only be done with the students' consent. The information that students submit during a course may, however, be used for the purposes of administrative data collection and research. No personal information is retained without the students' consent.

Non-Student Content

Everything on this site and within University of Illinois courses is copyrighted. The copyrights of all non-student work are owned by the University of Illinois Board of Trustees, except in approved cases where the original creator retains copyright of the material. Copyrights to external links are owned by or are the responsibility of those external sites. Students are free to view and print material from this site so long as

- the material is used for informational purposes only;
- the material is used for noncommercial purposes only; and
- copies of any material include the respective copyright notice.

These materials may not be mirrored or reproduced on non–University of Illinois websites without the express written permission of the University of Illinois Board of Trustees. To request permission, please contact the academic unit for the program.

Student Conduct

Students are expected to behave in accordance with the penal and civil statutes of all applicable local, state, and federal governments, with the rules and regulations of the Board of Regents, and with University regulations and administrative rules.

For more information about the student code and handbook, log in to SOURCe.

Netiquette

In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting online via e-mail or

discussion board messages, adapted from guidelines originally compiled by Chuq Von Rospach and Gene Spafford:

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect.
- Be brief; succinct, thoughtful messages have the greatest effect.
- Your messages reflect on you personally; take time to make sure that you are proud of their form and content.
- Use descriptive subject headings in your e-mails.
- Think about your audience and the relevance of your messages.
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-to-face communication, Internet messages are easy to misinterpret.
- When making follow-up comments, summarize the parts of the message to which you are responding.
- Avoid repeating what has already been said; needless repetition is ineffective communication.
- Cite appropriate references whenever using someone else's ideas, thoughts, or words.

Disability Accommodations

To ensure that disability-related concerns are properly addressed from the beginning of the course, students with disabilities who require assistance to participate in this class are asked to see the instructor as soon as possible. Also, to obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu.

Technology Requirements

Please review the general <hardware and software requirements> established for all online courses. Additionally, you can view the <video playback guidelines> for help with video content.

Please review the <tutorials> to better equip you to use the educational technologies required in your course.

Moodle

Moodle is the Learning Management System (LMS) in which your course is housed. It is where your course syllabus is kept, where readings and other content can be found, and where you submit your assignments and participate in discussions.

- <General Moodle help>
- <How to update your profile in Moodle>

Software Plug-Ins

Some elements of this course may require certainly freely downloadable plug-ins in order to function properly. Please visit this link to ensure you have the latest version of these plug-ins installed.

- \<Flash Player\>

Blackboard Collaborate Ultra (formerly Elluminate Live!)

Blackboard Collaborate Ultra is a Web conferencing tool that allows multiple people to meet synchronously to text chat, voice chat, and even video chat with one another.

- \<Participant Orientation\>

Communications

This section describes how you will be expected to communicate during this course.

Your daily contact should be via the discussion forums in our Learning Management System (Moodle) and via e-mail.

Questions pertaining to the course should be posted in our **Course Q & A** discussion forum. You can get to this forum from the course home page. Posting questions here allows everyone to benefit from the answers. If you have a question, someone else is probably wondering the same thing. Anyone submitting a question via e-mail will be directed to resubmit the question to the Q & A discussion forum. Also, participants should not hesitate to answer questions posed by peers if they know the answers and the instructor has not yet responded. This not only expedites the process, but also encourages peer interaction and support.

Questions of a personal nature should first sent to the instructor's e-mail address (instructor email). **When sending e-mail, include a subject that identifies the course number and nature of your question.**

If you have an **emergency** that will keep you from participating in the course, please notify your instructor by using the instructor's e-mail address (instructor email). Provide callback information in your e-mail (if necessary). You should also notify your program director of any emergencies.

Blackboard collaborate ultra is a tool that allows multiple people to join together simultaneously via a computer to text chat, audio chat, video chat, collaborate on a digital whiteboard, and even share your computer's desktop with one another. The Instructor's \<Virtual Office\> and the Student Lounge (when available) make use of *Blackboard Collaborate*.

Instructor's Virtual Office Hours

Another way to communicate with the instructor is to make use of the virtual office hours. The instructor will be available on the dates and during the times listed on the \<Virtual Office\> page

under **Syllabus** for office hours, via Blackboard Collaborate. You will be prompted to provide your name in order to enter the Student Lounge. Learn more about *Blackboard Collaborate* on the <Virtual Office> page at the left.

Student Lounge

Participants may also want an alternative way to meet synchronously with each other for studying together, group projects, problem solving, and so on. Students may enter the **Student Lounge** virtual *Blackboard Collaborate* classroom. The Student Lounge is available 24 hours a day, 7 days a week (except when *Blackboard Collaborate* is down for maintenance). Each session is recorded for the safety of the students who enter the Student Lounge.

See the **Student Lounge** page at the left for more information and a link to the Student Lounge.

Course Announcements

The <**Course Announcements>** forum serves as a way for your instructor and University of Illinois administrators to make <announcements> within our virtual learning environment. Announcements posted here will also be sent to your Illinois e-mail address, so be sure to check your e-mail or the Course Announcements forum at least once a day to see whether any new announcements have been made.

Email

Course participants can also use the internal e-mail tool inside Moodle to communicate privately with the instructor, group members, and each other. Make sure your e-mail address is current and activated within your Moodle Profile so that messages sent to you from within Moodle are automatically forwarded to your regular e-mail address as well.